

Question Booklet No. :

CEEE/2022

Register
Number

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2022
PAPER – I
ELECTRICAL ENGINEERING
(Degree Standard)

Duration : Three Hours]

[Total Marks : 300

Read the following instructions carefully before you begin to answer the questions.

IMPORTANT INSTRUCTIONS

1. You will be supplied with this question booklet 15 minutes prior to the commencement of the examination.
2. This question booklet contains 200 questions. Before answering the questions, you shall check whether all the questions are printed serially and ensure that there are no blank pages in the question booklet. **If any defect is noticed in the question booklet, it shall be reported to the invigilator within the first 10 minutes and get it replaced with a complete question booklet. If the defect is reported after the commencement of the examination, it will not be replaced.**
3. Answer all the questions. All the questions carry equal marks.
4. You must write your register number in the space provided on the top right side of this page. Do not write anything else on the question booklet.
5. An answer sheet will be supplied to you separately by the room invigilator to shade the answers. Instructions regarding filling of answers etc., which are to be followed mandatorily, are provided in the answer sheet and in the memorandum of admission (Hall Ticket).
6. You shall write and shade your question booklet number in the space provided on page one of the answer sheet with **BLACK INK BALL POINT PEN**. If you do not shade correctly or fail to shade the question booklet number, your answer sheet will be invalidated.
7. Each question comprises of five responses (answers) : i.e. (A), (B), (C), (D) and (E). You have to select **ONLY ONE** correct answer from (A) or (B) or (C) or (D) and shade the same in your answer sheet. If you feel that there are more than one correct answer, shade the one which you consider the best. **If you do not know the answer, you have to mandatorily shade (E).** In any case, choose **ONLY ONE** answer for each question. If you shade more than one answer for a question, it will be treated as a wrong answer even if one of the given answers happens to be correct.
8. You should not remove or tear off any sheet from this question booklet. You are not allowed to take this question booklet and the answer sheet out of the examination room during the time of the examination. After the examination, you must hand over your answer sheet to the invigilator. You are allowed to take the question booklet with you only after the examination is over.
9. You should not make any marking in the question booklet except in the sheets before the last page of the question booklet, which can be used for rough work. This should be strictly adhered to.
10. Failure to comply with any of the above instructions will render you liable for such action as the Commission may decide at their discretion.

SEAL

[Turn over

SPACE FOR ROUGH WORK



1. Sulphation in a lead-acid battery occurs due to
- (A) Heavy discharging (B) Fast charging
✓(C) Incomplete charging (D) Trickle charging
(E) Answer not known
2. _____ in the discharge rate, for a given battery results in a _____ in the amount of electrical energy that can be delivered.
- (A) decrease, decrease (B) decrease, increase
✓(C) increase, decrease (D) increase, increase
(E) Answer not known
3. At gradient height the shear force is
- (A) minimum ✓(B) zero
(C) one (D) maximum
(E) Answer not known
4. Practical efficiency obtained using wind mills is approximately in the range of
- (A) 5 to 10% ✓(B) 10 to 30%
(C) 30 to 50% (D) 50 to 80%
(E) Answer not known
5. The wind intensity can be described by
- (A) Reynolds Number (B) Mach Number
✓(C) Froude Number (D) Beaufort Number
(E) Answer not known

6. Which one of the following statement is not true for a micro hydro scheme?

- (A) A complicated and sophisticated control scheme is used
- (B) It has a capacity less than 100 kW
- (C) It is used where a grid does not exist
- (D) Power is generated for local use only
- (E) Answer not known

7. Which of the following causes the least pollution when burnt?

- (A) Petrol
- (B) Diesel
- (C) Coal
- (D) Natural gas
- (E) Answer not known

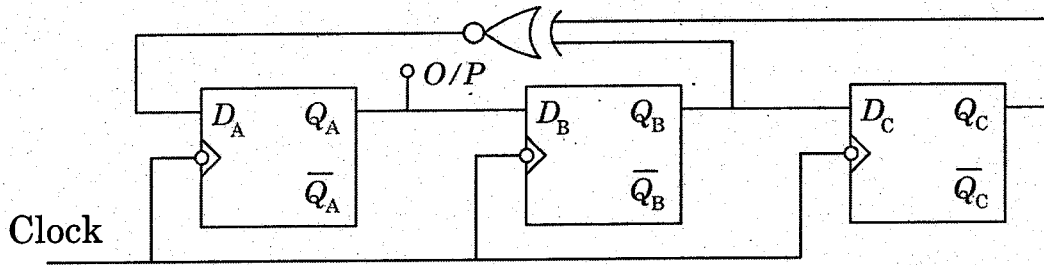
8. A grid-interactive solar system

- (A) Always supplies power to the grid
- (B) Always receives power from the grid
- (C) Supplies and receives power from grid as required
- (D) Works only when grid fails
- (E) Answer not known

9. The angle in the horizontal plane between one line due south and one horizontal projection of the normal to the inclined plane surface is

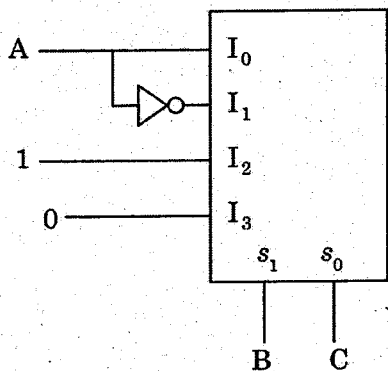
- (A) Slope
- (B) Solar Azimuth angle
- (C) Surface Azimuth angle
- (D) Zenith angle
- (E) Answer not known

10. Assuming that all the flip flops are in reset initially. The count sequence observant Q_A is



- (A) 0010111
 (B) 0001011
 (C) 0101111
 (D) 0110100
 (E) Answer not known
11. Race condition occurs in an asynchronous sequential circuit due to
- (A) the usage of more than 2 bits for state assignment
 (B) more than one output in the circuit
 (C) more than one change in state values during state transition
 (D) use of T flip flops in the circuit design
 (E) Answer not known

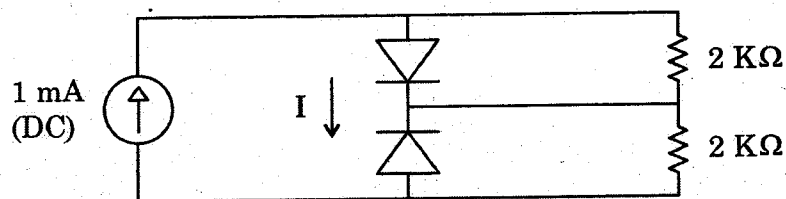
12. A 4×1 MUX is used to implement a 3-input Boolean function. The Boolean function $F(A, B, C)$ implemented is



- (A) $F(A, B, C) = \Sigma(1, 2, 4, 6)$
 (B) $F(A, B, C) = \Sigma(1, 2, 6)$
 (C) $F(A, B, C) = \Sigma(1, 5, 6)$
 (D) $F(A, B, C) = \Sigma(1, 5, 6)$
 (E) Answer not known

17. The energy gap in a semi conductor,
- (A) increases with temperature
 - (B) does not change with temperature
 - (C) decreases with temperature
 - (D) no energy gap will be there
 - (E) Answer not known

18. Assume that D_1 , D_2 are ideal diodes. The value of current I is



- (A) 0 mA
 - (B) 0.5 mA
 - (C) 1 mA
 - (D) 2 mA
 - (E) Answer not known
19. In N type semi conductor, there are
- (A) No majority carriers
 - (B) Holes as majority carriers
 - (C) Immobile negative ions
 - (D) Immobile positive ions
 - (E) Answer not known

20. Salient pole alternators are used when the

- (A) speed of the alternator is low and medium
- (B) power required is large
- (C) speed of the alternator is high
- (D) voltage generated is high
- (E) Answer not known

21. In a generating synchronous machine carrying load

- (A) E_f leads V_t by an angle δ
- (B) E_f lags V_t by an angle δ
- (C) E_f and V_t are in phase
- (D) E_f and V_t are in phase opposition
- (E) Answer not known

22. The maximum electrical power output of a synchronous generator is

- (A) $\frac{V_t E_f}{X_S}$
- (B) $\frac{V_t^2}{X_S}$
- (C) $\frac{E_f^2}{X_S}$
- (D) $\frac{X_S}{V_t E_f}$
- (E) Answer not known

23. In a synchronous machine, the induced emf phasor

- (A) leads the flux phasor by 90°
- (B) is in phase with the flux phasor
- (C) lags behind the flux phasor by 90°
- (D) is in phase opposition to the flux phasor
- (E) Answer not known



24. A 4 pole, 50 Hz induction motor is running at -2% slip. The actual speed of the rotor and its mode of operation is
- (A) 1500 rpm motor (B) 1470 rpm motor
 (C) 1530 rpm induction generator (D) 1560 rpm alternator
(E) Answer not known
25. The no load current drawn by a transformer is usually _____ percent of the full load current.
- (A) 0.2 to 0.5 (B) 2 to 5
(C) 12 to 15 (D) 20 to 30
(E) Answer not known
26. The purpose of providing iron core in a transformer is mainly
- (A) to provide support to windings
(B) to reduce hysteresis loss
(C) to reduce eddy current losses
 (D) to decrease the reluctance of magnetic flux path
(E) Answer not known
27. In a 1100/200 V transformer, if the resistive and reactive drops are 1 and 5 V respectively, the % regulation when it is working at 0.8 p.f. is
- (A) 2% (B) 1.9%
(C) 1.8% (D) 2.3%
(E) Answer not known
28. A 25 kVA transformer has a voltage ratio of 3300/400 V. The primary and secondary current will be
- (A) 4.0 A, 33 A (B) 7.576 A, 62.5 A
(C) 5.6 A, 66 A (D) 4.2 A, 58 A
(E) Answer not known

29. A 4 pole lap wound d.c. shunt motor has 60 armature slots and each slot contains 20 conductors. If the armature current is 50 A and flux per pole is 23×10^{-3} Wb, determine the gross torque in N-m. Assume armature reaction reduces the flux by 5%

(A) 417 Nm

(B) 644 Nm

✓ (C) 208.5 Nm

(D) 834 Nm

(E) Answer not known

30. A 4 pole dc generator has 378 wave wound conductors in its armature. If the flux per pole is 0.02 Wb, and the generator runs at a speed of 1000 rpm, the induced emf is

(A) 2.52 V

(B) 25.2 V

✓ (C) 252 V

(D) 2520 V

(E) Answer not known

31. Airgap at the pole tips of a DC machine is kept more than that at the centre of mains to reduce

(A) reactance voltage

(B) effect of armature reaction

✓ (C) losses of armature core

(D) noise of the machine

(E) Answer not known

32. A mathematical model of zero-order hold is

(A) e^{-sT}

(B) $1 - e^{-sT}$

✓ (C) $\frac{1 - e^{-sT}}{s}$

(D) $\frac{e^{-sT}}{s}$

(E) Answer not known

33. A good control system has all the following features except

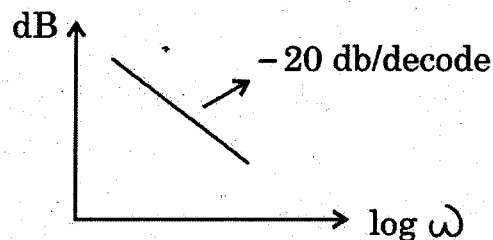
- (A) good stability
- (B) slow response
- (C) good accuracy
- (D) sufficient power handling capacity
- (E) Answer not known

34. The Routh array of a characteristic equation is given. The number of roots lying on the right hand side of S-plane is

S^4	9
S^3	8
S^2	-4
S^1	2
S^0	1

- (A) 0
- (C) 2
- (E) Answer not known
- (B) 1
- (D) 3

35. The given Bode Plot represents the transfer function,



- (A) $G(S) = \frac{1}{S^2}$
- (B) $G(S) = \frac{K}{S+20}$
- (C) $G(S) = \frac{K}{S(S+5)}$
- (D) $G(S) = \frac{1}{S}$
- (E) Answer not known

36. The transfer function of a system is $\frac{3S^2 + 4S + 4}{(S + 2)^2 + (S + 1)}$. The characteristic equation is,
- (A) $3S^2 + 4S + 4 = 0$
 (B) $(S + 2)^2 + (S + 1) = 0$
 (C) $(3S^2 + 4S + 4) + (S + 2)^2 + (S + 1) = 0$
 (D) $(S + 2)^2(S + 1) - (3S^2 + 4S + 4) = 0$
 (E) Answer not known
37. The transfer function of a system is $T(S) = \frac{K}{S^3(1 + ST)}$. The type and order of the system is
- (A) 2 and 3 (B) 3 and 2
 (C) 3 and 3 (D) 3 and 4
 (E) Answer not known
38. The open loop transfer function of a feedback control system is $G(S)H(S) = \frac{1}{(S + 1)^3}$. The gain margin of the system is
- (A) 2 (B) 4
 (C) 8 (D) 16
 (E) Answer not known
39. Which of the following effects in the system is NOT caused by negative feedback?
- (A) Reduction in gain
 (B) Increase in Bandwidth
 (C) Increase in distortion
 (D) Reduction in output impedance
 (E) Answer not known

40. A varying magnetic field linking a coil is given by $\phi = \frac{1}{3} \lambda t^3$, if at time $t = 3$ sec, the emf induced is 9 V, then λ is

- (A) zero (B) 1 wb/sec²
 (C) -1 wb/s² (D) 9 wb/sec²
 (E) Answer not known

41. Which of the following field equation indicate that the free magnetic charges does not exist?

- (A) $\vec{H} = (1/\mu)(\nabla \times \vec{A})$ (B) $\vec{H} = \int \frac{\vec{I} d\vec{l} \times \vec{v}}{4\pi R^2}$
 (C) $\nabla \cdot \vec{H} = 0$ (D) $\nabla \times \vec{H} = \vec{J}$
 (E) Answer not known

42. Statement A : Magnetic current consists of entirely a displacement component and no conductance component.

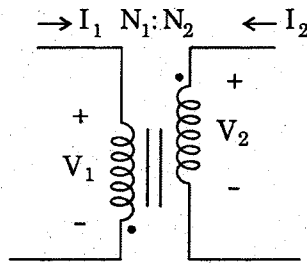
Statement B : Magnetic flux lines are always continuous

- (A) Both Statement A, Statement B are correct. Statement B is correct explanation of Statement A
 (B) Both Statements are correct. But Statement B is not correct explanation of A
 (C) Statement A is true but B is false
 (D) Statement A is False, but Statement B is true
 (E) Answer not known

43. The expression $\oint \vec{H} \cdot d\vec{l} = \int_S \vec{J} \cdot \vec{d}s$ represents

- (A) Lenz's Law (B) Maxwell equation
 (C) Ampere's Law (D) Faraday's Law
 (E) Answer not known

44. The ideal transformer has $N_2/N_1 = 10$. The ratio V_2/V_1 is



- (A) 10
 (B) 0.1
 (C) -0.1
 (D) -10
 (E) Answer not known
45. A coil of 500 turns is linked by a flux of 0.2 mWb. If the flux is reversed in 0.01 s, then the emf induced in the coil is
- (A) 200 V
 (B) 20 V
 (C) 2 V
 (D) 0.2 V
 (E) Answer not known

46. The total electric flux is given by the expression $\phi_E = \frac{1}{4\pi\epsilon_0} \frac{q}{R^2} (4\pi R^2)$.

What can you say about the flux?

- (A) The flux is dependent of the radius R of the sphere
 (B) The flux is independent of the radius R of the sphere
 (C) The flux is inversely proportional to q
 (D) The flux is directly proportional to ϵ_0
 (E) Answer not known
47. Find the potential between points $p(1, -1, 0)$ and $q(2, 1, 3)$ with $E = 40xy\vec{i} + 20x^2\vec{j} + 2\vec{k}$
- (A) 104
 (B) 105
 (C) 106
 (D) 107
 (E) Answer not known

48. If a vector field Q is solenoidal, which of these is true?
- (A) $\oint_L Q \cdot dI = 0$ ✓ (B) $\oint_S Q \cdot dS = 0$
 (C) $\nabla \times Q = 0$ (D) $\nabla \times Q \neq 0$
 (E) Answer not known
49. Given field $A = 3x^2 yz a_x + x^3 z a_y + (x^3 y - 2z) a_z$ it can be said that A is
- (A) Harmonic (B) Divergenceless
 (C) Solenoidal ✓ (D) Conservative
 (E) Answer not known
50. A potential difference V_0 is applied to a mercury column in a cylindrical container. The mercury is now poured into another cylindrical container of half the radius and the same potential difference V_0 applied across the ends. As a result of this change of space, the resistance will be increased
- (A) 2 times (B) 4 times
 (C) 8 times ✓ (D) 16 times
 (E) Answer not known
51. The energy stored in Electric field is
- (A) $\frac{1}{2} \epsilon E$ ✓ (B) $\frac{1}{2} \epsilon E^2$
 (C) ϵE^2 (D) None
 (E) Answer not known
52. The number of links required to connect 8 nodes in mesh topology is
- (A) 8 (B) 16
 (C) 7 ✓ (D) 28
 (E) Answer not known

53. Multiplexing technique that shifts each signal to a different carrier frequency is called
- (A) Frequency Division Multiplexing
 - (B) Time Division Multiplexing
 - (C) Both (A) and (B)
 - (D) Space Division Multiplexing
 - (E) Answer not known
54. Which of the following block is not a part of the PCM transmitter?
- (A) Sampling
 - (B) Quantization
 - (C) Encoder
 - (D) Decoder
 - (E) Answer not known
55. In pulse code modulation, when number of quantization levels increase,
- (A) Noise decreases, cost reduces, BW decreases
 - (B) Noise decreases, cost increases, BW increases
 - (C) Noise increases, cost reduces, BW decreases
 - (D) Noise increases, cost increases, BW increases
 - (E) Answer not known
56. If the DFT of a signal $x_1(n)$ is $X_1(K)$ and $x_2(n)$ is $X_2(K)$, then the circular convolution of the signal $x_1(n) * x_2(n)$ is
- (A) $X_1(K) X_2(K)$
 - (B) $X_1(K) + X_2(K)$
 - (C) $X_1(K) - X_2(K)$
 - (D) $X_2(K) - X_1(K)$
 - (E) Answer not known



57. The value stored in RAM location 30H is 40 H and the value stored in RAM location 40 H is 10 H. What will be the value in the accumulator after the following instructions are executed in 8051?

```
MOV RO, #30H      MOV @R1, A
MOV A, @R0        XCHD A, @R0
MOV R1, A
MOV A, #7FH
```

- (A) 7FH (B) 4FH
 (C) 40H (D) 70H
 (E) Answer not known

58. The seventh bit D_7 of control register in 8255 is 1. It specifies that, $D_6 - D_0$ determines

- (A) I/O functions in various modes (B) Input mode
 (C) Output mode (D) Bit set/Reset mode
 (E) Answer not known

59. Match the following :

Programmable Devices	USE
(a) 8253	1. Programmable Keyboard and Displace Interface
(b) 8255	2. Direct Memory Access
(c) 8257	3. Programmable Interval Timer/Counter
(d) 8279	4. Parallel I/O

- (a) (b) (c) (d)
 (A) 3 1 2 4
 (B) 3 4 2 1
 (C) 3 2 4 1
 (D) 2 3 4 1
 (E) Answer not known

60. To save energy during braking
- (A) Dynamic braking is used
 - (B) Plugging is used
 - (C) Regenerative braking is used
 - (D) Mechanical braking is used
 - (E) Answer not known
61. SMPS is used for
- (A) obtaining controlled ac power supply
 - (B) obtaining controlled dc power supply
 - (C) storage of dc power
 - (D) storage of ac power
 - (E) Answer not known
62. Statement A : A line-commutated inverter changes DC voltage into AC voltage
- Statement B : A single phase half bridge inverter uses two thyristors
- (A) Statements A and B are true. B explains A
 - (B) Statements A and B are true. B is not explanation for A
 - (C) Statement A is true. Statement B is false
 - (D) Statement A is false and B is true
 - (E) Answer not known
63. If a three phase bridge inverter, each step consist of
- (A) 30°
 - (B) 60°
 - (C) 90°
 - (D) will depend on firing angle
 - (E) Answer not known

64. In a single phase half controlled converter, for continuous conduction, free wheeling diode conducts for

(A) $\pi - \alpha$

(B) π

(C) α

(D) $\pi + \alpha$

(E) Answer not known

65. A step down dc.d.c chopper has a resistive load of $R:15 \text{ Ohm}$ and input voltage $V_s:200\text{V}$. When the chopper remains ON, its voltage drop is 2.0 V . The chopper frequency is 1 kHz . If the duty cycle is 50% , then the average output voltage is

(A) 100 V

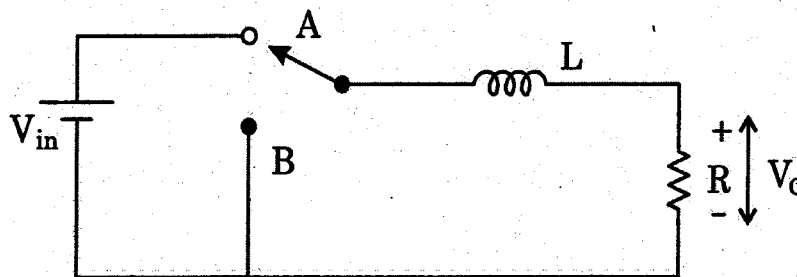
(B) 101 V

(C) 99 V

(D) 98 V

(E) Answer not known

66. The circuit shown is a



(A) Step down chopper

(B) Half wave rectifier

(C) Step up chopper

(D) Full wave rectifier

(E) Answer not known

67. Match the List I (Power Electronic Converter) with List II (Applications) and choose the correct answer from the codes mentioned below:

List I (Power Electronic Converter)	List II (Applications)
(a) Phase Controlled AC-DC converters	1. High frequency induction heating
(b) AC voltage controller	2. High power low speed AC Drive
(c) Cycle converter	3. Ceiling Fan Regulator
(d) Inverter	4. Battery charge controller

- | | (a) | (b) | (c) | (d) |
|-------|------------------|-----|-----|-----|
| ✓ (A) | 4 | 3 | 2 | 1 |
| (B) | 4 | 3 | 1 | 2 |
| (C) | 3 | 4 | 2 | 1 |
| (D) | 3 | 4 | 1 | 2 |
| (E) | Answer not known | | | |



68. Which of the following is used in SCR to protect from high dv/dt ?

- (A) Snubber circuit
- (B) Fuse
- (C) Equalizing circuit
- (D) Circuit breaker
- (E) Answer not known

69. Match the List I (Parameters) with List II (Devices) and select the correct answer using the codes given below the lists:

List I (Parameters)

List II (Devices)

- | | |
|------------------------------|-----------------|
| (a) Pinchoff voltage | 1. Power diode |
| (b) Latching current | 2. Power MOSFET |
| (c) Softness factor | 3. Power BJT |
| (d) Soft and hard saturation | 4. SCR |

(a) (b) (c) (d)

(A) 2 4 3 1

(B) 1 3 4 2

(C) 1 3 2 4

(D) 2 4 1 3

(E) Answer not known

70. Consider the following statements. Which of the following are correct?

- (1) Positive sequence currents are present in all types of faults.
- (2) Negative sequence currents are present in all unsymmetrical faults.
- (3) Zero sequence currents are present when neutral of the system is grounded and the fault involves the ground.

(A) 1 and 2 only

(B) 1 and 3 only

(C) 2 and 3 only

(D) 1, 2 and 3 only

(E) Answer not known

71. A circuit breaker is essentially

(A) an arc extinguisher

(B) a current interrupting device

(C) a power factor correcting device

(D) a device to neutralise the transient effects

(E) Answer not known



72. Match the List I (improvements in transmission system) with List II (effects due to improvements) and select the correct answer using the codes given below the lists:

List I (improvements)	List II (effects)
(a) Increasing the spacing between conductors	1. Increase string efficiency
(b) Increased flashover voltage	2. Reduces tension in the overhead line
(c) Increasing sag in overhead line	3. Corona reduces
(d) Usage of gaurd ring	4. Safety factor of insulator increases

- | | (a) | (b) | (c) | (d) |
|---|------------------|-----|-----|-----|
| (A) | 2 | 4 | 1 | 3 |
| (B) | 4 | 1 | 2 | 3 |
| <input checked="" type="checkbox"/> (C) | 3 | 4 | 2 | 1 |
| (D) | 4 | 2 | 3 | 1 |
| (E) | Answer not known | | | |

73. The string efficiency of a high voltage line is around

- | | |
|----------------------|---|
| (A) 100% | <input checked="" type="checkbox"/> (B) 80% |
| (C) 40% | (D) 10% |
| (E) Answer not known | |

74. For a 400 kV line, the numbers of discs in an insulator string is around
- (A) 37 (B) 31
 (C) 25 (D) 16
(E) Answer not known
75. Large size steam plants and nuclear plants are suitable for
- (A) Peak loads
(B) Intermediate loads
 (C) Base loads
(D) Both base and peak loads
(E) Answer not known
76. Determine the new per unit impedance Z_{pu} new if the base MVA and base kV are doubled and the old per unit impedance Z_{pu} old is 0.1 on its own base values.
- (A) 0.8 (B) 0.2
 (C) 0.05 (D) 0.01
(E) Answer not known
77. Location of a surge tank in a hydro electric power system is near
- (A) Turbine
(B) Tailrace
(C) Reservoir
(D) Dam
(E) Answer not known



78. Identify the element, which is not a part of a data acquisition system.
- (A) Digital to Analog converter
 - (B) Filter
 - ✓ (C) Display
 - (D) Timer
 - (E) Answer not known
79. A signal has minimum and maximum values of $-5V$ and $+5V$ respectively. To record a $0.01 V$ change of the signal value, _____ length of A/D converter is required.
- (A) 4 bit
 - ✓ (C) 10 bit
 - (B) 8 bit
 - (D) 0 bit
 - (E) Answer not known
80. A current carrying conductor is shown below in Fig. (a), If it is brought in a magnetic field in Fig. (b).

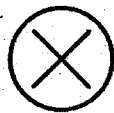


Fig (a)

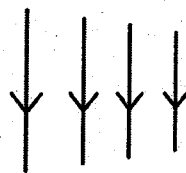


Fig (b)

- (A) it will experience a force from left to right
- ✓ (B) it will experience a force from right to left
- (C) it will experience a force from top to bottom
- (D) it will experience no force
- (E) Answer not known

81. The variable-inductance type electrical transducer is

- (A) LVDT
- (B) Strain gauge
- (C) Capacitive transducer
- (D) Photovoltaic cell
- (E) Answer not known

82. The nominal ratio of a current transformer is

- (A) Primary winding current/Secondary winding current
- (B) Rated primary winding current/Rated Secondary winding current
- (C) Number of Secondary winding turns/Number of primary winding turns
- (D) $\frac{(\text{Primary Winding Current})^2}{\sqrt{\text{Secondary Winding Current}}}$
- (E) Answer not known

83. An electro-dynamometer type of instrument finds its major use as

- (A) standard instrument only
- (B) both as standard and transfer instrument
- (C) transfer instrument only
- (D) indicator type instrument
- (E) Answer not known

84. For a certain load, one of the wattmeter reads 20 kW and the other 5 kW after the voltage circuit of this wattmeter has been reversed. The power factor of the load is

- (A) 0.1273 leading
- (B) 0.3273 leading
- (C) 0.3273 lagging
- (D) 0.1273 lagging
- (E) Answer not known

85. A Maxwell's bridge is used to measure an inductive impedance. The bridge constants at balance are $C_1 = 0.01 \mu\text{F}$, $R_1 = 470 \text{ k}\Omega$, $R_2 = 5.1 \text{ k}\Omega$, and $R_3 = 100 \text{ k}\Omega$. Find the series equivalent of the unknown impedance.

(A) $R_X = 1.09 \text{ k}\Omega$, $C_X = 0.01 \mu\text{F}$

(B) $R_X = 1.09 \text{ k}\Omega$, $L_X = 5.1 \text{ H}$

(C) $L_X = 5.1 \text{ H}$, $C_X = 0.01 \mu\text{F}$

(D) $L_X = 5.1 \text{ H}$, $R_X = 0.109 \text{ k}\Omega$

(E) Answer not known

86. The power consumption of PMMC instrument is typically about

(A) 0.25 W to 2 W

(B) 0.25 mW to 2 mW

(C) 25 μW to 200 μW

(D) 0.25 μW to 2 μW

(E) Answer not known

87. The damping force acts on the moving system of an indicating instrument only when it is

(A) moving

(B) stationary

(C) near its full deflection

(D) just starting to move

(E) Answer not known

88. In a delta connected three phase system, the relation between the line and the phase values of voltage and current are

(A) $V_L = V_{ph}, I_L = \sqrt{3} I_{ph}$

(B) $V_L = \sqrt{3} V_{ph}, I_L = I_{ph}$

(C) $V_L = \frac{V_{ph}}{\sqrt{3}}, I_L = I_{ph}$

(D) $V_L = V_{ph}, I_L = \frac{I_{ph}}{\sqrt{3}}$

(E) Answer not known

89. The sum of the Instantaneous voltages around a delta connected supply is equal to

(A) the maximum line voltage

(B) twice the maximum line voltage

(C) $\sqrt{2}$ times the rms value of the phase voltage

(D) zero

(E) Answer not known

90. Condition for reciprocity of two port networks is

(A) $A = D$

(B) $AD - BC = 1$

(C) $AD + BC = 1$

(D) $\Delta h = 1$

(E) Answer not known



91. In an RLC parallel circuit _____ and _____ are minimum at resonance.

- (A) current, admittance
- (B) voltage, resistance
- (C) voltage, impedance
- (D) current, impedance
- (E) Answer not known

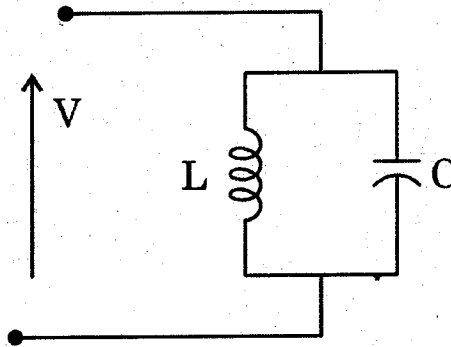
92. In a series RLC circuit, if C is increased, what happens to resonant frequency?

- (A) It increases
- (B) It remains the same
- (C) It decreases
- (D) It becomes zero
- (E) Answer not known

93. A parallel RLC circuit has $L = 2\text{H}$ and $C = 0.25\text{ F}$. The value of R that will produce unity damping factor is

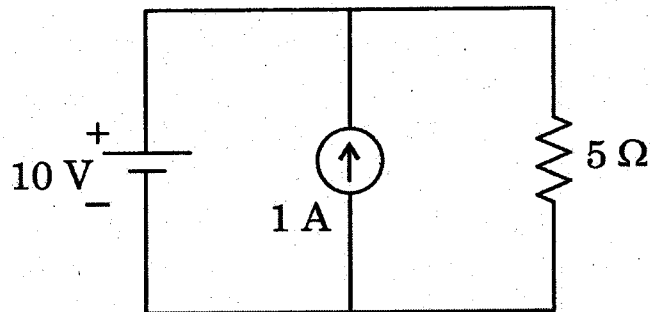
- (A) 0.5Ω
- (B) 1Ω
- (C) 2Ω
- (D) 4Ω
- (E) Answer not known

94. For the tank circuit shown below, find the circulating current at resonance, for a supply voltage of V volts (a.c.). Neglect any resistance of the circuit.



- (A) $\left[\frac{VL}{C}\right]^{1/2}$ (B) $V\left[\frac{L}{C}\right]^{1/2}$
 (C) $V\left[\frac{C}{L}\right]^{1/2}$ (D) $\left[\frac{VC}{L}\right]^{1/2}$
 (E) Answer not known

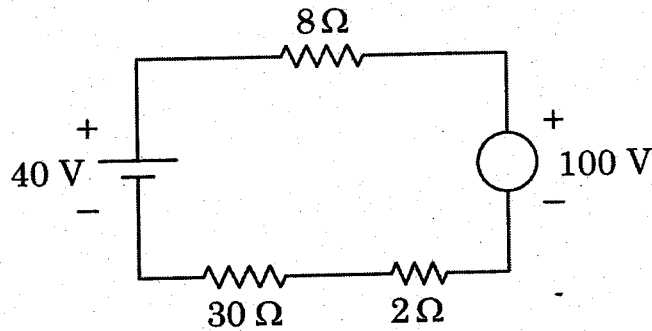
95. In the circuit shown below, find the current through the 5Ω resistor



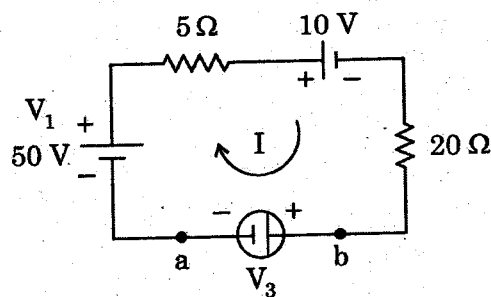
- (A) 1 A
 (B) 2 A
 (C) 10 A
 (D) 20 A
 (E) Answer not known



96. The voltage across 30Ω in the circuit shown is



- (A) 30 V
(B) 45 V
(C) 18 V
(D) 24 V
(E) Answer not known
97. The Thevenin impedance of a network seen from the load terminals is $(80 + j55)\Omega$. For maximum power transfer, the load impedance must be
- (A) $(-80 + j55)\Omega$
(B) $(-80 - j55)\Omega$
(C) $(80 - j55)\Omega$
(D) $(80 + j55)\Omega$
(E) Answer not known
98. Find V_3 , if the current I in the circuit shown in the figure is 0.40 A



- (A) 10 V
(B) 15 V
(C) 20 V
(D) 30 V
(E) Answer not known

99. The simplest method of hydrogen production is

- (A) Biophotosynthesis
- (B) Electrolysis of water
- (C) Steam reforming of Methane
- (D) Thermolysis of water
- (E) Answer not known

100. As load is increased on an open circuited a fuel cell

- (A) Its efficiency increases
- (B) Its output voltage remains unchanged
- (C) Its output voltage decreases
- (D) Its output voltage increases
- (E) Answer not known

101. As compared to a lead-acid cell, the efficiency of a nickel-iron cell is less due to its

- (A) Compactness
- (B) Higher Internal Resistance
- (C) Lower e.m.f.
- (D) Smaller quantity of electrolytes used
- (E) Answer not known

102. Which of the following statements is not true about battery storage?

- (A) It is a modular and portable source of energy
- (B) The cost of battery storage is high
- (C) It has prolonged life
- (D) It has the ability of rapid switchover between charging and discharging operations
- (E) Answer not known



103. Darriens rotor is associated with

- (A) Tidal energy
- (B) Nuclear energy
- ✓ (C) Vertical axis wind turbine
- (D) Horizontal axis wind turbine
- (E) Answer not known

104. If the speed of a wind stream remains unchanged while passing through the rotor,

- (A) a large power will be generated
- (B) the flow is known as stalled flow
- (C) the speed of the rotor will be very high
- ✓ (D) zero power will be generated
- (E) Answer not known

105. Induction generator used in wind mills

- (A) cannot work in isolation
- (B) can work in isolation
- ✓ (C) should work in parallel with synchronous generators
- (D) should work without synchronous generators
- (E) Answer not known

106. An Induction Generator Controller (IGC) controls

- (A) Only the voltage and not the frequency
- (B) Only the frequency and not the voltage
- ✓ (C) Both the voltage and frequency
- (D) The power input to the generator
- (E) Answer not known

107. For small schemes (less than 2 kW), (12 – 24V) dc generation is desirable where

- (A) All loads are close to the generator
- (B) All loads are far away from the generator
- (C) Only lamp loads are used
- (D) Only dynamic loads are used
- (E) Answer not known

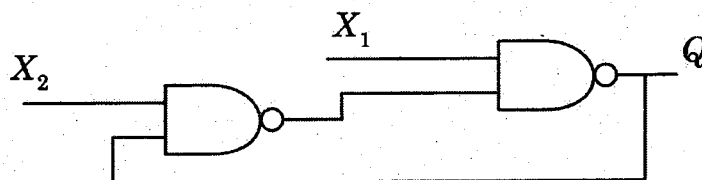
108. A cylindrical parabolic concentrator requires

- (A) no tracking
- (B) one axis tracking
- (C) two axis tracking
- (D) seasonal adjustment
- (E) Answer not known

109. Global warming is mainly caused due to

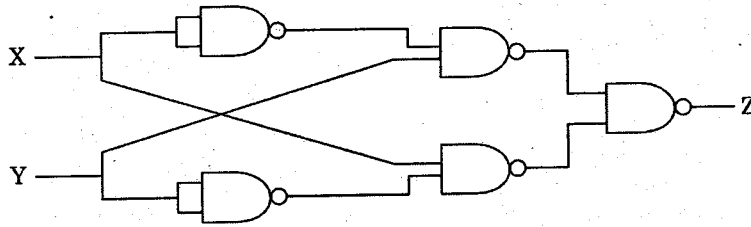
- (A) Air Pollution
- (B) Emission of heat from engines
- (C) Emission of CO₂ due to burning of fossil fuels
- (D) Use of Nuclear Energy
- (E) Answer not known

110. In the figure $X_1 = 1$, $X_2 = 1$, the output Q remains



- (A) at 1
- (B) at 0
- (D) unstable
- (C) at its initial value
- (E) Answer not known

111. The logic circuit shown in figure realizes the function



- (A) XOR (B) XNOR
(C) Half adder (D) Full adder
(E) Answer not known

112. Direct couple amplifier is used to amplify

- (A) frequency below 100 Hz
 (B) frequency below 10 Hz
(C) frequency above 10 kHz
(D) frequency above 20 kHz
(E) Answer not known

113. Another name of voltage to frequency converter is

- (A) Astable Multivibrator
(B) Monostable Multivibrator
(C) Phase lock loop
 (D) Voltage controlled oscillator
(E) Answer not known

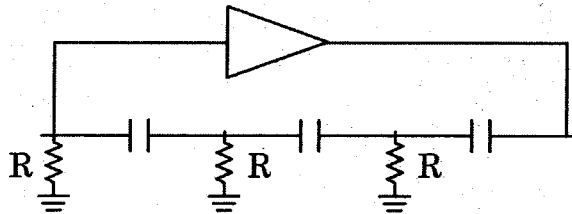
114. The ideal Op-Amp has the following characteristics

- (A) $R_i = 0, R_o = 0, BW = 0$ (B) $R_i = \infty, R_o = 0, BW = \infty$
(C) $R_i = 0, R_o = \infty, BW = \infty$ (D) $R_i = \infty, R_o = \infty, BW = \infty$
(E) Answer not known

115. What happens when emitter bypass capacitor gets open circuited in CE amplifier?

- (A) No change in the output voltage
- (B) AC base voltage decreases
- ✓ (C) AC base voltage increases
- (D) AC base voltage become zero
- (E) Answer not known

116. The frequency of oscillation of the oscillator circuit shown in figure



- ✓ (A) $\frac{1}{2\pi\sqrt{6}RC}$
- (B) $\frac{1}{2\pi RC}$
- (C) $\frac{1}{\sqrt{6}RC}$
- (D) $\frac{\sqrt{6}}{2\pi RC}$
- (E) Answer not known

117. A centre tap full-wave rectifier supplies a load of $1\text{ k}\Omega$. The ac voltage across the secondary is $200\text{-}0\text{-}200\text{ V}$ (rms). If the diode resistance is neglected, the d.c. load current is

- (A) 18 A
- (B) 0.18 A
- (C) 0.9 A
- (D) 9 A
- (E) Answer not known



121. The main reason for using a hysteresis motor for high quality tape-recorders is that

(A) its speed is constant

(B) it develops extremely and steady torque able to synchronous any load

(C) it requires no centrifugal switch

(D) it is unaffected by mechanical vibration

(E) Answer not known

122. The synchronous speed of a 3 phase induction motor having 6 poles and running at 970 rpm when connected to a 50 Hz supply is

(A) 1500 rpm

(B) 1000 rpm

(C) 1200 rpm

(D) 3000 rpm

(E) Answer not known

123. The power factor of a squirrel cage induction motor is

(A) low at light loads

(B) low at heavy loads

(C) low at light and heavy loads

(D) low at rated load only

(E) Answer not known

124. The starting current of an induction motor is five times the full load current while the full load slip is 4%. The ratio of starting torque to full load torque is

(A) 0.6

(B) 0.8

(C) 1.0

(D) 1.2

(E) Answer not known



125. In a small transformer the primary and secondary windings are of thin wires. In a short circuit test, the frequency is increased to 100 Hz from 50 Hz

- (A) the copper losses will increase by four times
- (B) the copper loss will reduce to one fourth
- (C) the copper loss will remain the same
- (D) the copper loss will be doubled
- (E) Answer not known

126. The DC generator that has poorest voltage regulation is

- (A) Shunt generator
- (B) Series generator
- (C) Flat-compounded generator
- (D) Over-compounded generator
- (E) Answer not known

127. A 10 kW, 250 V dc, 6 pole shunt generator runs at 1000 rpm. When delivering full load. The armature has 534 lap connected conductors. Full load C_v loss is 0.64 kW. The total brush drop is 1 Volt. Determine the flux per pole. Neglect shunt current.

- (A) 30 mWb
- (B) 90 mWb
- (C) 0.3 mWb
- (D) 0.9 mWb
- (E) Answer not known

128. If there is a contact error in the output signals, derivative control will

- (A) reduce the error to zero
- (B) reduce the error but not secularly to zero
- (C) loss to effect on the error
- (D) increase the error
- (E) Answer not known

129. A lead compensator in a control system,

- (A) speeds up the transient response and increases the margin of stability of the system
- (B) slows down the transient response and increases the margin of stability of the system
- (C) speeds up the transient response and decreases the margin of stability of the system
- (D) slows down the transient response and decreases the margin of stability of the system
- (E) Answer not known

130. The gain margin for a stable system

- (A) has a positive decibel value
- (B) has a negative decibel value
- (C) has zero decibel value
- (D) has an imaginary decibel value
- (E) Answer not known

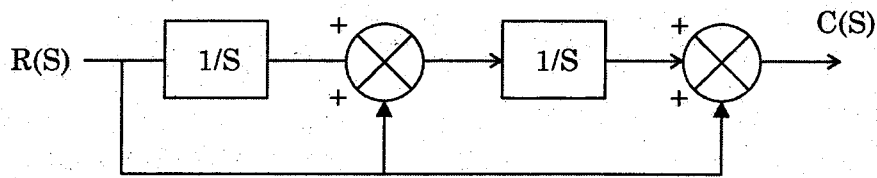
131. In Bode plot the factor $\frac{1}{j\omega}$ in the transfer function gives a line having slope.

- (A) -20 dB per octane
- (C) -6 dB per octane
- (B) -10 dB per octane
- (D) -2 dB per octane
- (E) Answer not known



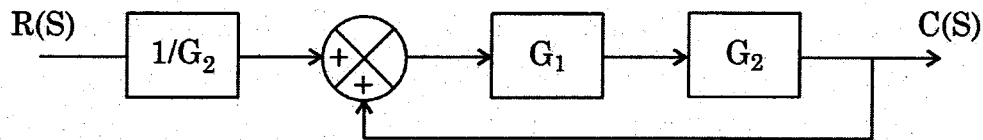
132. The characteristic equation of a system is given by,
 $S^3 + 3S^2 + 2S + 5 = 0$. The system is,
 (A) unstable (B) stable
 (C) partially stable (D) marginally stable
 (E) Answer not known
133. In the Bode plot of a unity feedback control system, the value of phase of $G(j\omega)$ at the gain cross over frequency is (-125°) , the phase margin of the system is,
 (A) -125° (B) 125°
 (C) $+55^\circ$ (D) -55°
 (E) Answer not known
134. A negative feedback closed loop system is supplied with an input of 10 V. The system has forward gain of 1 and a feedback gain of 1. The output voltage is,
 (A) 2.5 V (B) 5 V
 (C) 10 V (D) 20 V
 (E) Answer not known
135. If a system has two real and equal characteristic roots, it is described as
 (A) having to damping (B) being critically damped
 (C) being underdamped (D) being overdamped
 (E) Answer not known
136. The characteristic equation of a closed loop system is $S^2 + 2S + 2 = 0$. Then the system is,
 (A) over damped (B) critically damped
 (C) under damped (D) undamped
 (E) Answer not known

137. For the block diagram shown, the transfer function $\frac{C(S)}{R(S)}$ equals



- (A) $\frac{S^2 + 1}{S^2}$ ✓ (B) $\frac{S^2 + S + 1}{S^2}$
 (C) $\frac{S^2 + S + 1}{S^3}$ (D) $\frac{1}{S^2 + S + 1}$
 (E) Answer not known

138. The transfer function of the given block diagram is,



- (A) $\frac{C(S)}{R(S)} = \frac{G_1}{1 + G_1 G_2}$ ✓ (B) $\frac{C(S)}{R(S)} = \frac{G_1}{1 - G_1 G_2}$
 (C) $\frac{C(S)}{R(S)} = \frac{G_2}{1 - G_1 G_2}$ (D) $\frac{C(S)}{R(S)} = \frac{G_2}{1 + G_1 G_2}$
 (E) Answer not known

139. The characteristic polynomial and the poles of a system with the transfer function, $G(S) = \frac{4(S + 2)}{(S + 3)(S + 4)}$ is

- (A) $4S + 8$ and -3 and -4
 (B) $S^2 + 7S + 12 = 0$ and -2 , -3 and -4
 (C) $4S + 8$ and -2
 ✓ (D) $S^2 + 7S + 12 = 0$ and -3 and -4
 (E) Answer not known

140. An emf will be induced in a conductor if

- (A) it is perpendicular to the magnetic field
- (B) it is parallel to the magnetic flux
- (C) it lies in any direction to the flux
- (D) it is moving at right angle to the flux
- (E) Answer not known

141. The Lorentz force in vector notation is

- (A) $(\vec{I} \times \vec{B})L$
- (B) $(I^2 \cdot B^2) L$
- (C) $\sqrt{I/B} \cdot L$
- (D) $\frac{L}{\sqrt{I/B}}$
- (E) Answer not known

142. A circuit has 1000 turns enclosing a magnetic circuit 20 cm² in section. With 4A, the flux density is 1.0 Wb/m² and with 9 A, it is 1.4 Wb/m². The mean value of the inductance between these current limits is

- (A) 1600 H
- (B) 160 H
- (C) 16 H
- (D) 0.16 H
- (E) Answer not known

143. The coefficient of coupling for two coils having $L_1 = 2H$, $L_2 = 8H$, $M = 3H$ is

- (A) 0.1875
- (B) 0.75
- (C) 1.333
- (D) 5.333
- (E) Answer not known

144. Statement A: The current in a constant inductive system does not change instantaneously.

Statement B: In constant inductive system the flux linkage is conserved initially

(A) Statements A and B are true Statement B is correct explanation for A

(B) Statements A and B are true but B is not correct explanation for A

(C) Statement A is true and B is false

(D) Statement A is false and B is true

(E) Answer not known

145. $\nabla \cdot (\nabla \times A)$ is equal to

(A) 1

(B) -1

(C) 0

(D) ∞

(E) Answer not known

146. A wedge is described by $z = 0.30^\circ < \phi < 60^\circ$. Which of the following is incorrect?

(A) The wedge lies in the $x - y$ plane

(B) It is infinitely long

(C) On the wedge, $0 < \rho < a$

(D) A unit normal to the wedge is $\pm a_z$

(E) Answer not known

147. A potential field is given by $V = 3x^2y - yz$. Which of the following is not true?

(A) At point $(1, 0, -1)$, V and E vanish

(B) $x^2y = 1$ is an equipotential line on the xy plane

(C) The equipotential surface $V = -8$ passes through point $P(2, -1, 4)$

(D) The electric field $a + P$ is $12a_x - 8a_y - a_z$ V/m

(E) Answer not known

148. The synchronisation points location is decided by

- (A) Physical layer
- (B) Transport layer
- (C) Session layer
- (D) Presentation layer
- (E) Answer not known

149. A typical example for a TDM system is _____

- (A) Multiplexing of Address and Data lines in a microprocessor
- (B) A local telephone system
- (C) Broad cast Radio
- (D) Broadcast TV
- (E) Answer not known

150. In mesh topology, the relationship between one device and another is

- (A) Primary to peer
- (B) Peer to Peer
- (C) Peer to primary
- (D) Primary to secondary
- (E) Answer not known

151. In circuit switching, the path

- (A) to be followed depends on length of message
- (B) upto next intermediate node is allocated before transmission of message begins
- (C) upto destination is allocated before transmission of message begins
- (D) Both (A) and (B)
- (E) Answer not known

152. The biggest disadvantages of PCM is

- (A) inability to handle analog signals
- (B) the high error rate which its quantizing noise introduces
- (C) incompatibility with TDM
- (D) the requirement of larger bandwidth
- (E) Answer not known

153. Companding is used

- (A) to overcome quantization noise in PCM
- (B) in PCM transmission, to allow amplitude limiting in the receiver
- (C) to protect small signals in PCM from quantizing distortion
- (D) to overcome impulse noise
- (E) Answer not known

154. Quantizing noise occurs in

- (A) TDM
- (C) PCM
- (B) FDM
- (D) PWM
- (E) Answer not known

155. The device select signals, \overline{CS} , A_1 , A_0 are 0, 1, 0 respectively. The selected I/O port is

- (A) Port A
- (C) Port C
- (B) Port B
- (D) 8255A is not selected
- (E) Answer not known

156. Number of ports used in an expanded mode in 8051 are,

- (A) one
- (B) two
- (C) three
- (D) four
- (E) Answer not known



157. Which the following statements are True in 8085 microprocessor?

- (i) CMP and SUB instructions are same
- (ii) INR instruction does not affect the carry flag
- (iii) XRA A instruction clears the accumulator and resets all flags except Parity flag

- (A) (i) only
- (B) (i) and (ii)
- (C) (ii) and (iii)
- (D) (iii) only
- (E) Answer not known

158. Match the following

Type of Instruction	Instruction
(a) One byte Instruction	1. MVI, A, 32H
(b) 2 byte Instruction	2. LDA 2050
(c) 3 byte Instruction	3. ADD B

(a) (b) (c)

(A) 1 2 3

(B) 3 2 1

(C) 2 1 3

(D) 3 1 2

(E) Answer not known

159. _____ pin 8086 indicates the presence of arithmetic co-processor in the 8086 microprocessor system.

- (A) READY
- (B) $\overline{\text{DEN}}$
- (C) $\overline{\text{BHE}}$
- (D) $\overline{\text{TEST}}$
- (E) Answer not known

160. Stator voltage control for speed control of induction motor is suitable for

- (A) fan and pump drives
- (B) drive of a crane
- (C) running it as a generator
- (D) constant load drive
- (E) Answer not known

161. The output voltage waveform of a 3ϕ square wave inverter contains

- (A) Only even harmonics
- (B) Both odd and even harmonics
- (C) Only odd harmonics
- (D) Only triplen harmonics
- (E) Answer not known

162. Consider the following statements pertaining to Voltage Source Inverter (VSI)

- (i) Voltage Source Inverter has stiff d.c. voltage source at its input terminals
- (ii) Voltage Source inverter, is one in which the d.c. source has small or negligible impedance.
- (iii) Voltage Source Inverters are not suitable for multimotor drives
- (iv) In Voltage Source Inverters, a short circuit occurs its terminals causes current to raise very fast.

All of these statements

- (A) (i), (ii) and (iv) are correct
- (B) (ii) and (iii) are correct
- (C) (i) and (iii) are correct
- (D) (iii) and (iv) are correct
- (E) Answer not known

163. A single phase voltage source square wave inverter feeds pure inductive load. The wave form of load current will be

- (A) Sinusoidal
- (B) Rectangular
- (C) Trapezoidal
- (D) Triangular
- (E) Answer not known



164. Match the List I (Converter topology) with List II (Ripple frequency) and choose the correct answer:

List I (Converter topology)	List II (Ripple frequency)
(a) Three phase half controlled converter	1. $2f_s$
(b) Single phase half wave controlled converter	2. $6f_s$
(c) Three phase fully controlled converter	3. $3f_s$
(d) Single phase fully controlled converter	4. f_s

- | | (a) | (b) | (c) | (d) |
|-------|------------------|-----|-----|-----|
| (A) | 1 | 2 | 4 | 3 |
| (B) | 3 | 2 | 4 | 1 |
| ✓ (C) | 3 | 4 | 2 | 1 |
| (D) | 3 | 2 | 1 | 4 |
| (E) | Answer not known | | | |

165. The cooling time constant of a motor is usually

- (A) Less than heating time constant
- (B) Equal to heating time constant
- (C) More than heating time constant
- (D) Proportional to load
- (E) Answer not known

166. The voltage blocking capability of IGBT is determined by

- (A) injection layer
- (B) body layer
- (C) metal used for contacts
- (D) drift layer
- (E) Answer not known

167. The circuit turn – off time of an SCR is defined as the time

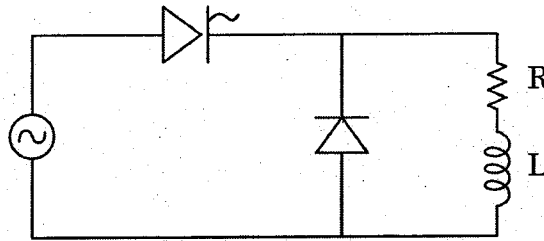
- (A) Taken by the SCR to turn off
- (B) Require for the SCR current to become Zero
- (C) For which SCR is reverse biased by the commutative circuit
- (D) For reducing current below holding current
- (E) Answer not known

168. The latching current of SCR is 20 mA. Its holding current will be

- (A) 23 mA
- (B) 40 mA
- (C) 10 mA
- (D) 60 mA
- (E) Answer not known



169. Choose the correct statement with respect to the below given circuit



- (A) The load voltage can never be negative
- (B) The load voltage can never be positive
- (C) The load voltage can never be zero
- (D) The load current can be negative
- (E) Answer not known

170. The pressure of SF₆ gas in circuit breaker is around

- (A) 0.25 kg/cm²
- (B) 1 kg/cm²
- (C) 4 kg/cm²
- (D) 40 kg/cm²
- (E) Answer not known

171. For a single line to ground fault, on phase a , the terminal conditions are

- (A) $V_a = 0; I_b = I_c = 0$
- (B) $V_b = 0; I_a = I_c = 0$
- (C) $V_c = 0; I_a = I_c = 0$
- (D) $V_a = 0; V_b = 0; I_c = 0$
- (E) Answer not known

172. If the fault current is 2000 A, the relay setting is 50% and CT ratio is 400/5, the plug setting multiplier is

- (A) 25
- (B) 15
- (C) 50
- (D) 10
- (E) Answer not known

173. Consider the following statements related to the function of a booster in distribution network

- (1) Booster is a series dc generator connected in series with the feeder.
- (2) Booster is a series dc generator connected in parallel to the feeder.
- (3) Feeders can be regulated independently

Which of the following are correct?

- (A) 1 and 2
- (B) 2 and 3
- (C) 1 and 3
- (D) 1 only
- (E) Answer not known

174. If capacitance between two conductors of a 3 phase line is $4\mu F$, then capacitance of each conductor to neutral is

- (A) $4\mu F$
- (B) $8\mu F$
- (C) $12\mu F$
- (D) $0.25\mu F$
- (E) Answer not known



175. The main drawback(s) of underground system over overhead system in transmission and distribution of power is/are

- (A) exposure to lightning
- (B) heavy initial cost
- (C) exposure to smoke, ice, wind
- (D) interference between power and communication lines
- (E) Answer not known

176. Pin type insulators are generally not used for voltages exceeding

- (A) 66 kV
- (B) 33 kV
- (C) 25 kV
- (D) 11 kV
- (E) Answer not known

177. In a transmission system the feeder supplies power to

- (A) transformer substations (step-up)
- (B) service mains
- (C) distributors
- (D) feeders
- (E) Answer not known

178. If, the voltage magnitude V and phase angle δ are specified for the bus, the bus is classified as

- (A) Slack bus
- (B) Generator bus
- (C) Load bus
- (D) Feeder
- (E) Answer not known

179. The number of units generated will be more, if the _____ is more.
- (A) Cost factor
 - (B) Demand factor
 - (C) Depreciation factor
 - (D) Load factor
 - (E) Answer not known
180. In which of the following power system economic calculation methods, a fixed depreciation charge is made every year and interest compounded on it annually?
- (A) Diminishing value method
 - (B) Linear value method
 - (C) Sinking fund method
 - (D) Straight line method
 - (E) Answer not known
181. A steam power station has an overall efficiency of 20% and 0.5 kg of coal is burnt per kWh of electrical energy generated. If the heat equivalent of 1 kWh is 860 KCal how much will be the calorific value of fuel.
- (A) 860 KCal/kg
 - (B) 86 KCal/kg
 - (C) 8600 KCal/kg
 - (D) 344 KCal/kg
 - (E) Answer not known
182. Digital to analog converter can be considered as a
- (A) decoding device
 - (B) encoding device
 - (C) multiplexer
 - (D) summing amplifier
 - (E) Answer not known

183. There are 100 turns in the moving coil of the moving coil instrument and the coil is wound on a 3 cm side square former. If the flux density in the air gap is 0.06 Wb/m^2 and it carries a current of 12 mA, the deflecting torque on the coil is

- (A) $21.6 \times 10^{-6} \text{ N-m}$
- (B) $64.8 \times 10^{-6} \text{ N-m}$
- (C) $32.4 \times 10^{-6} \text{ N-m}$
- (D) $42.3 \times 10^{-6} \text{ N-m}$
- (E) Answer not known

184. Thermocouples works on

- (A) induction effect
- (B) seebeck effect
- (C) piezo-electric effect
- (D) magnetostrictive effect
- (E) Answer not known

185. Dummy strain gauges are used for

- (A) compensation of temperature changes
- (B) increases of the sensitivity of bridge in which they are included
- (C) compensating for different expansion
- (D) calibration of strain gauges
- (E) Answer not known

186. The transducer that converts measurand into the form of pulse is a _____ transducer.

- (A) digital
- (B) active
- (C) analog
- (D) pulse
- (E) Answer not known

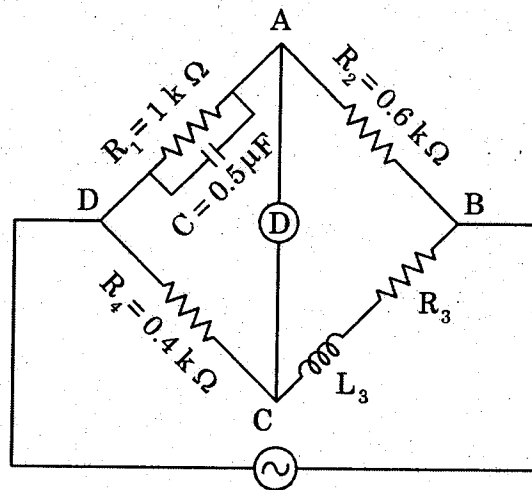
187. In spring-controlled moving Iron instrument, the scale is

- (A) Uniform
- (B) Cramped at lower end and expanded at the upper end
- (C) Expanded at lower end and Cramped at upper end
- (D) Cramped both at lower and at the upper end
- (E) Answer not known

188. A dual beam CRO uses

- (A) Electronic Switch
- (B) Two sets of VDPs and single set of HDPs
- (C) One electron gun
- (D) Two time base generator circuits
- (E) Answer not known

189. The bridge shown in fig. is balanced. The value of R_3 and L_3 will be



- (A) 120 Ω , 0.12 H
- (B) 240 Ω , 0.12 H
- (C) 280 Ω , 0.129 H
- (D) 120 Ω , 0.24 H
- (E) Answer not known

190. To measure precise inductance from a few μH to several henries, _____ bridge is used.

- (A) Maxwell's
- (B) Hay
- (C) Maxwell-Wein
- (D) Anderson
- (E) Answer not known

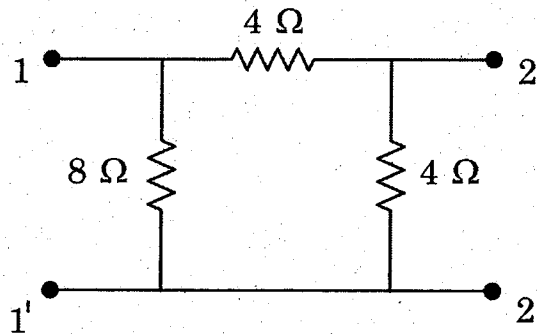
191. The material of wires used for making resistance standards is usually

- (A) Manganin
- (B) Nichrome
- (C) Copper
- (D) Phosphor bronze
- (E) Answer not known

192. If $v_1 = 30 \sin(\omega t + 10^\circ) \text{V}$ and $v_2 = 20 \sin(\omega t + 50^\circ) \text{V}$, which of these statements are true?

- (A) v_1 leads v_2
- (B) v_2 leads v_1
- (C) v_1 and v_2 are in phase with each other
- (D) v_1 and v_2 are exactly out of phase with each other
- (E) Answer not known

193. The input and output impedance of the two port network shown in the figure respectively



- ✓ (A) 4 Ω, 3 Ω (B) 4 Ω, 2 Ω
(C) 3 Ω, 2 Ω (D) 2 Ω, 1 Ω
(E) Answer not known

194. The h -parameters h_{11} and h_{21} are obtained

- ✓ (A) by shorting output terminals
(B) by opening input terminals
(C) by shorting input terminals
(D) by opening output terminals
(E) Answer not known

195. The current in a 2H inductor varies at a rate of 2 A/S. Find the energy stored in the magnetic field after 2S.

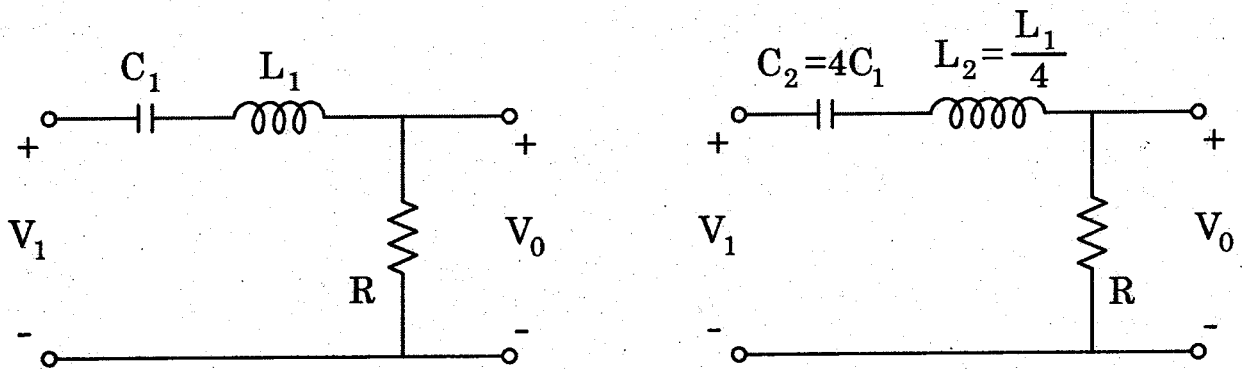
- (A) 4J (B) 32J
✓ (C) 16J (D) 8J
(E) Answer not known



196. An RC circuit with $R = 150 \Omega$ and $C = 2 \mu\text{F}$ is excited by a dc source of 15V by closing the switch at $t = 0$. The initial and final voltage across the capacitor are respectively.

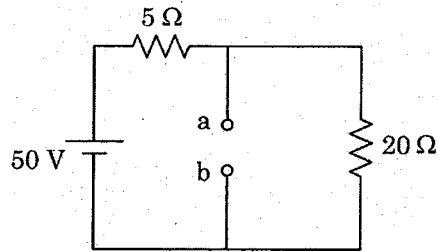
- (A) 10 V, 15 V
- (B) 15 V, 0 V
- (C) 0 V, 15 V
- (D) 0 V, 10 V
- (E) Answer not known

197. Two series resonant filters are shown in the figure below. Let the 3-dB bandwidth of filter 1 is B_1 and that of filter 2 be B_2 . The value of $\frac{B_1}{B_2}$ is



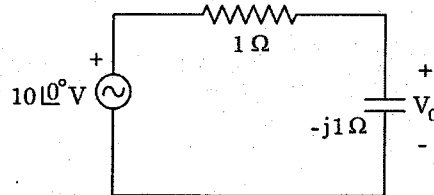
- (A) 4
- (B) 1
- (C) 1/2
- (D) 1/4
- (E) Answer not known

198. Thevenins voltage (V_{Th}) and Thevenins resistance (R_{Th}) at terminals a and b in circuit shown below is



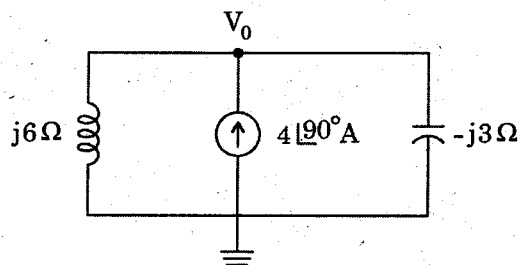
- (A) $V_{Th} = 50\text{ V}$, $R_{Th} = 20\Omega$ ~~(B) $V_{Th} = 40\text{ V}$, $R_{Th} = 4\Omega$~~
 (C) $V_{Th} = 4\text{ V}$, $R_{Th} = 40\Omega$ (D) $V_{Th} = 50\text{ V}$, $R_{Th} = 5\Omega$
 (E) Answer not known

199. The voltage V_0 across the capacitor in the circuit is



- (A) $5\angle 0^\circ\text{ V}$ (B) $7.071\angle 45^\circ\text{ V}$
~~(C) $7.071\angle -45^\circ\text{ V}$~~ (D) $5\angle -45^\circ\text{ V}$
 (E) Answer not known

200. Find the voltage V_0 of the circuit shown below,



- (A) -24 V (B) -8 V
 (C) 8 V ~~(D) 24 V~~
 (E) Answer not known

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